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Survey of DMSP Charging Events During the Period Preceding Cycle 23 Solar Maximum

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It has been well established that POLAR orbiting satellites can see mild to severe charging levels during solar minimum conditions (Frooninckx and Sojka, 1992, Anderson and Koons, 1996, Anderson, 2012). However, spacecraft operations during solar maximum cannot be considered safe from auroral charging. Recently, we have seen examples of high level charging during the recent approach to solar maximum. We present here a survey of charging events seen by the Defense Meteorological Satellite Program (DMSP) satellites (F16, F17) during the solstices of 2011 and 2012. In this survey, we summarize the condition necessary for charging to occur in this environment, we describe how the lower than normal maximum conditions are conducive to the environment conditions necessary for charging in the POLAR orbit, and we show examples of the more extreme charging events, sometimes exceeding 1 kV, during this time period. We also show examples of other interesting phenomenological events seen in the DMSP data, but which are not considered surface charging events, and discuss the differences.